Drilling Technology

Presented to the Subcommittee on Ocean Energy Exploration

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Michael Saucier
Minerals Management Service
Gulf of Mexico Region
Regional Supervisor, Field Operations

Agenda

The *Deepwater Horizon,* a dynamically positioned, semisubmersible drilling unit (photo courtesy of Transocean).

- Rig Types
- Rig Floor Mechanization
- Pressure Containment
- Directional Drilling
- Measurement While Drilling
- Subsea Tiebacks
- Onshore Infrastructure

Drilling Rigs

On November 16, 2003 , a new record was set by drilling a well in 10,011 feet of water.

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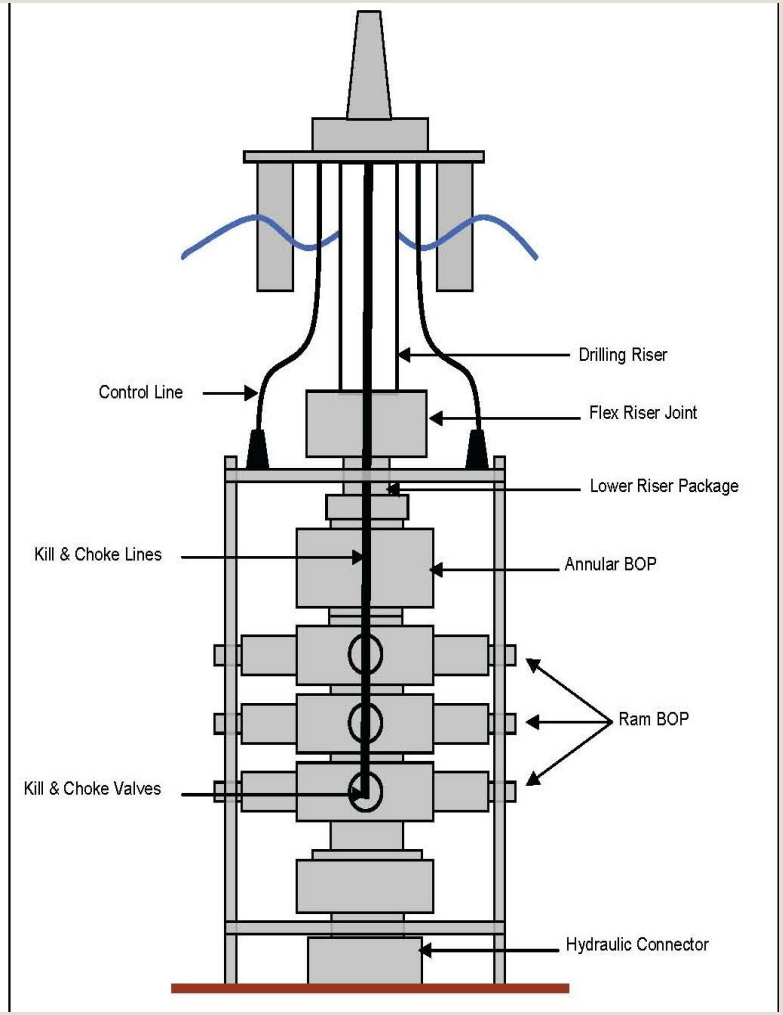
Rig Floor Mechanization

- Pipe Handling Systems
- Iron Roughneck
- Vertical Alignment Tools
- Stabberless Systems

Blowout Preventers (BOP)

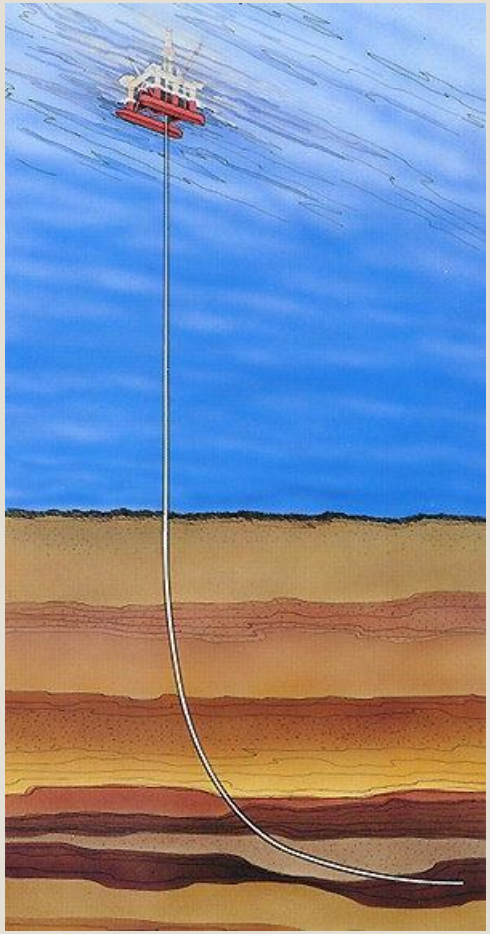
- Used to contain well in pressure situations
- The BOP consists of:
  - Annular
  - Pipe Rams
  - Blind/Blind Shear Rams
  - Choke and Kill lines

Subsea BOP Stack

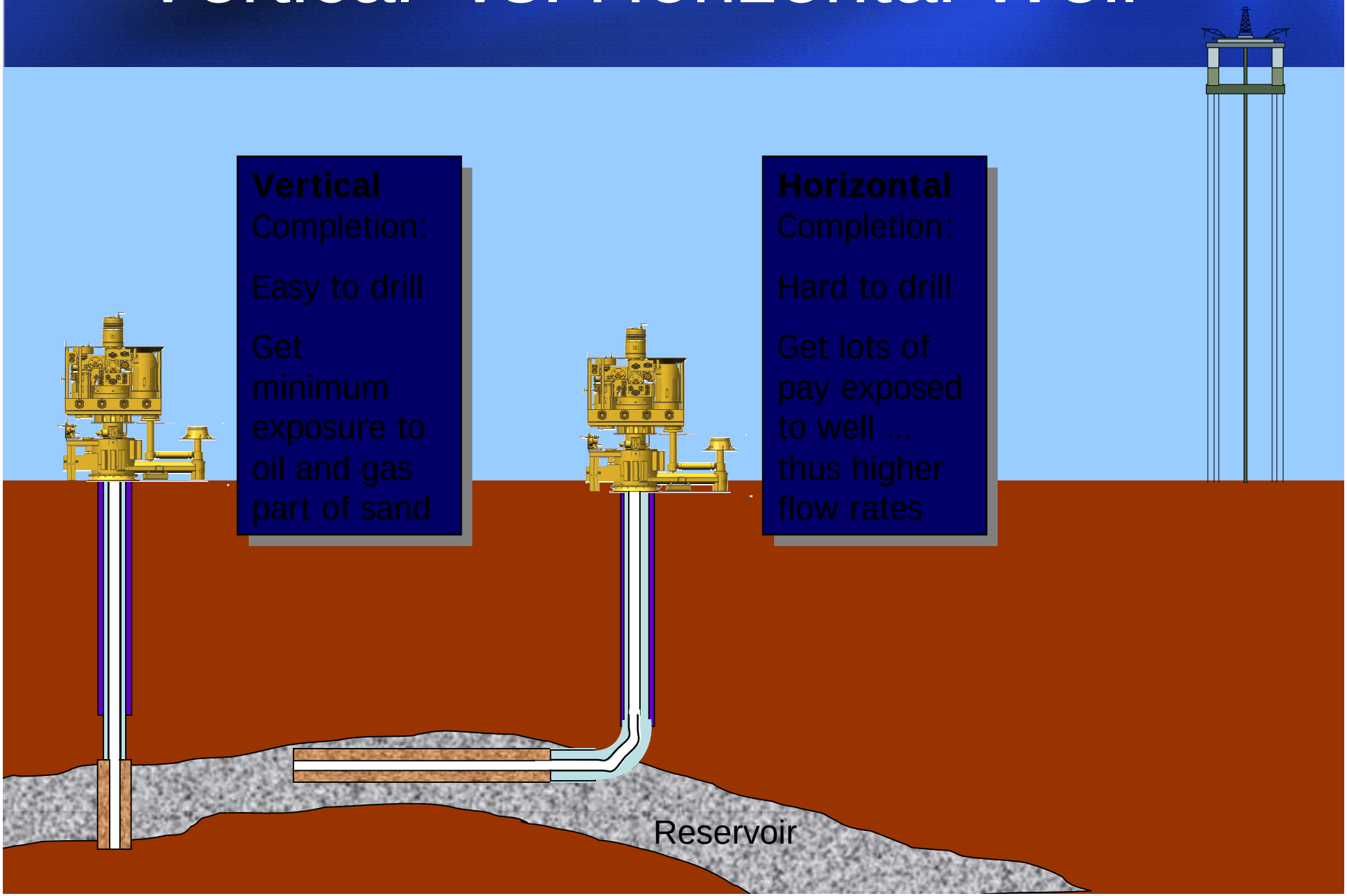


Directional Well

- Allows drilling multiple wells from one surface location
- Allows penetration of multiple reservoirs from one well
- Contact more reservoir surface area
- Can drill under sensitive areas without surface disturbance

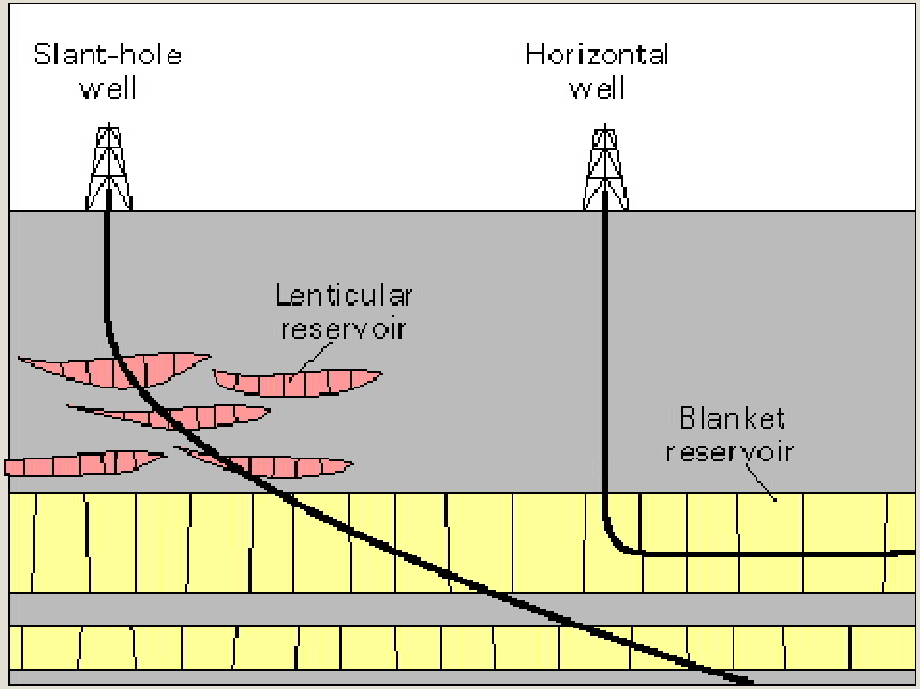


Vertical vs. Horizontal Well



Directional Drilling

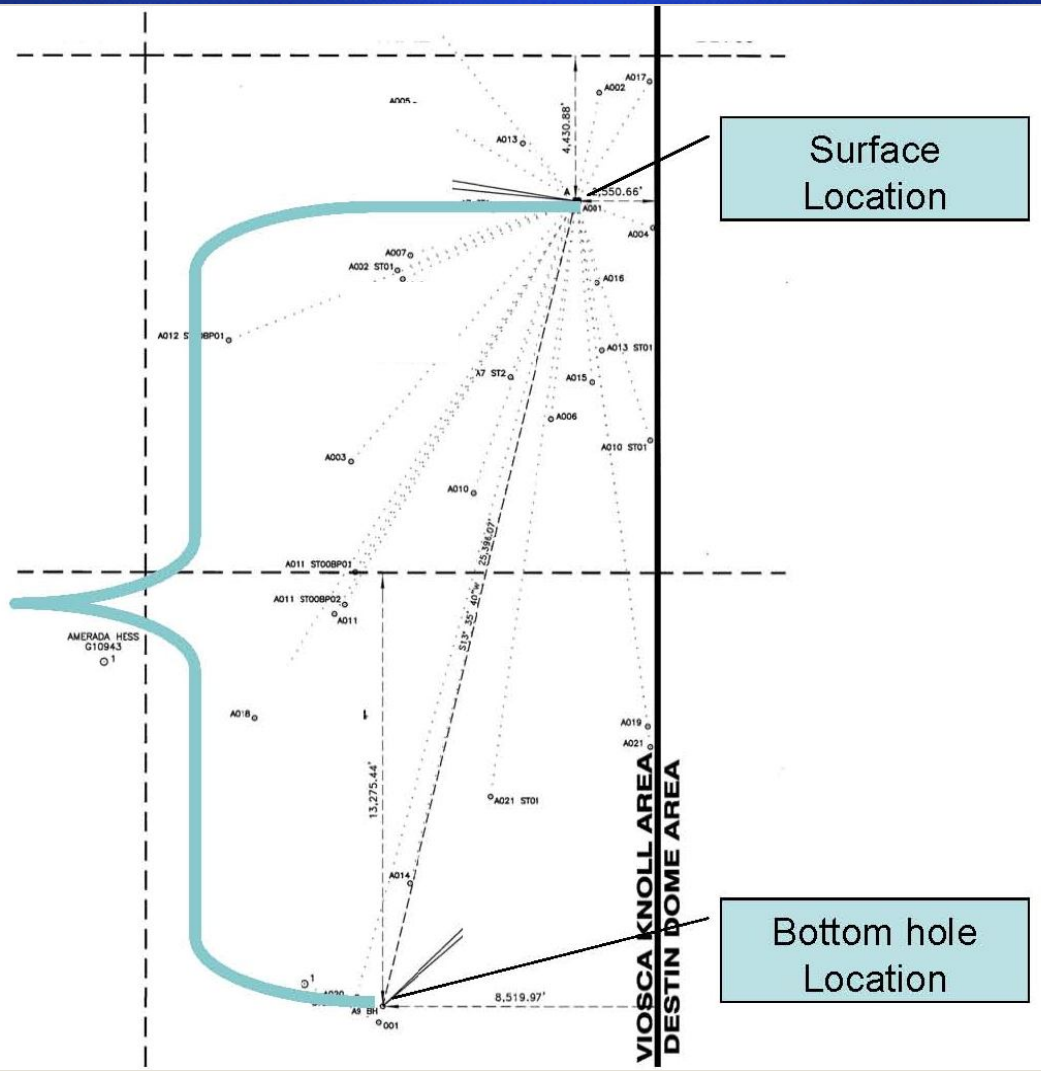
- Intentional deviation of a wellbore from the vertical
- Controlled directional drilling makes it possible to reach subsurface areas laterally remote from the point where the bit enters the earth



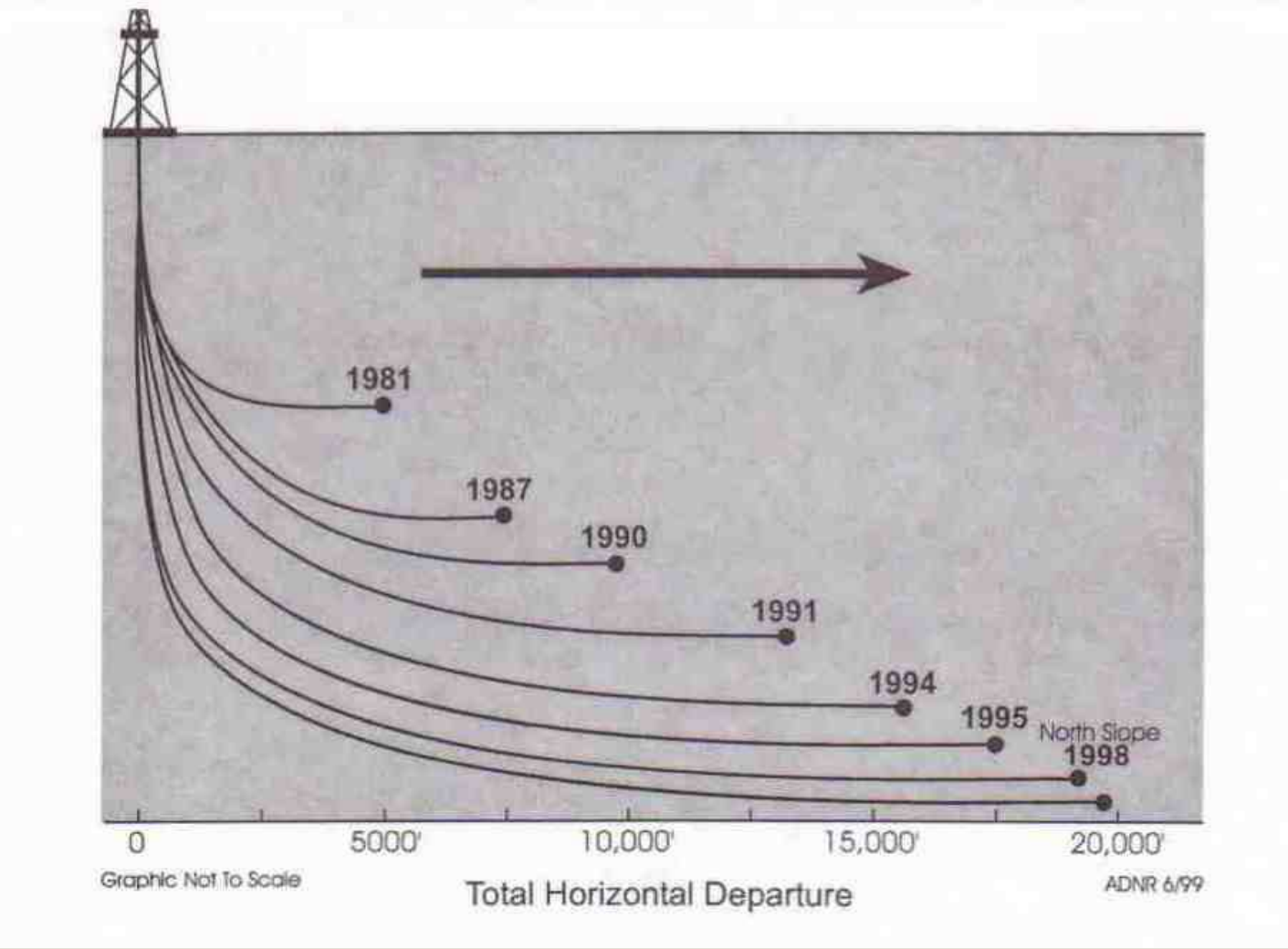
Directional Offset -Top View

In GOM – this is the greatest offset well drilled to date.

Horizontal distance from surface location to the bottom hole location is about 26,000 feet



Extended Reach

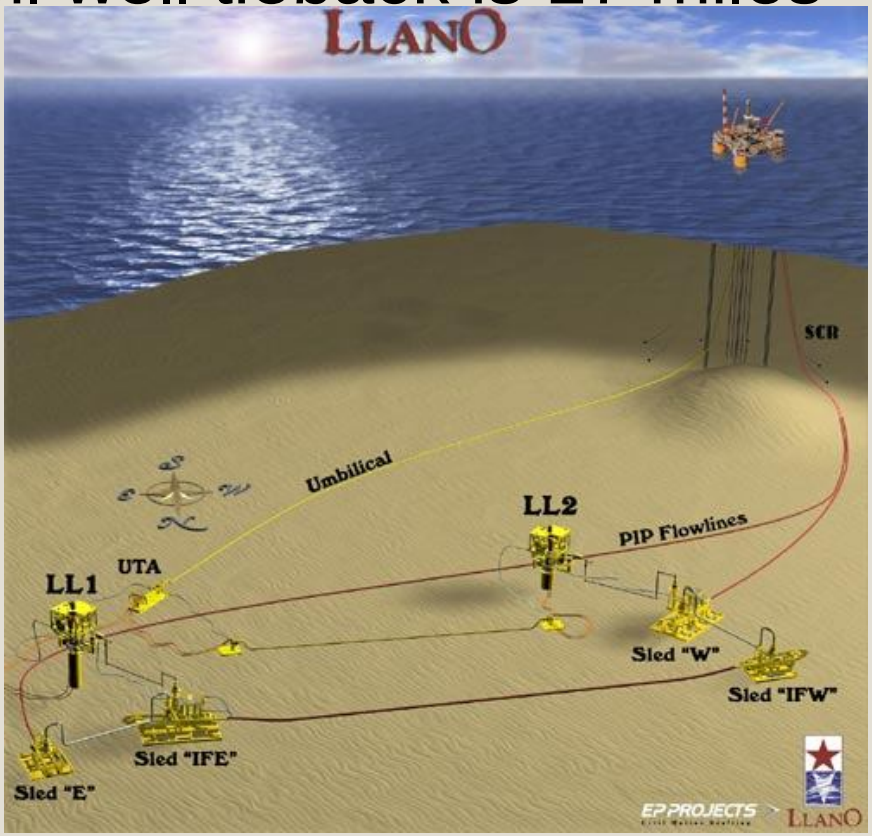


Measurement While Drilling (MWD)

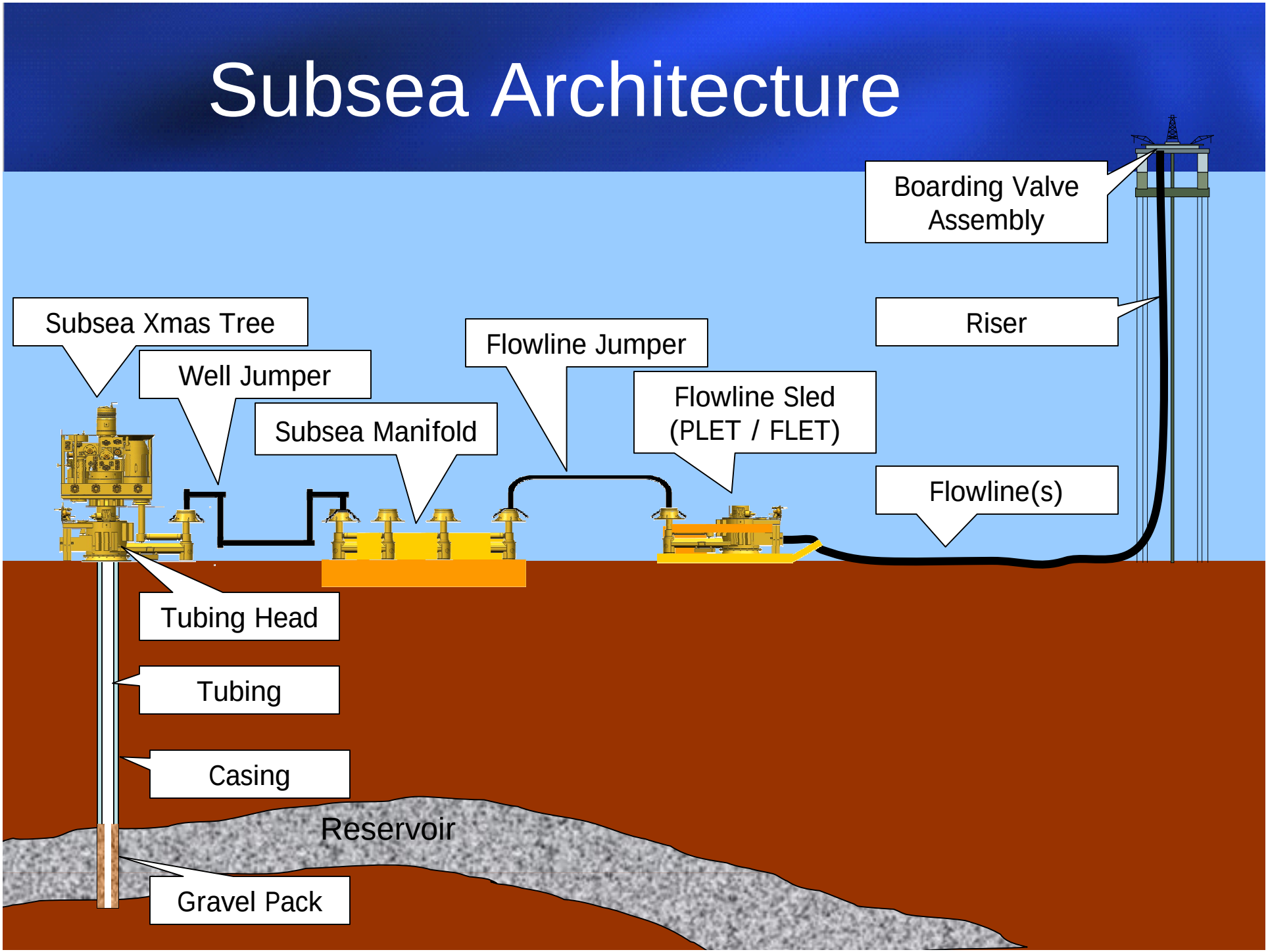
- Directional Information
- Bottom Hole Pressure Data
- Bottom Hole Temperature
- Formation Properties
- Drill Bit and Pipe Torque

Subsea Tiebacks

- Longest gas well tieback is 77 miles
- Longest oil well tieback is 17 miles



Subsea Architecture

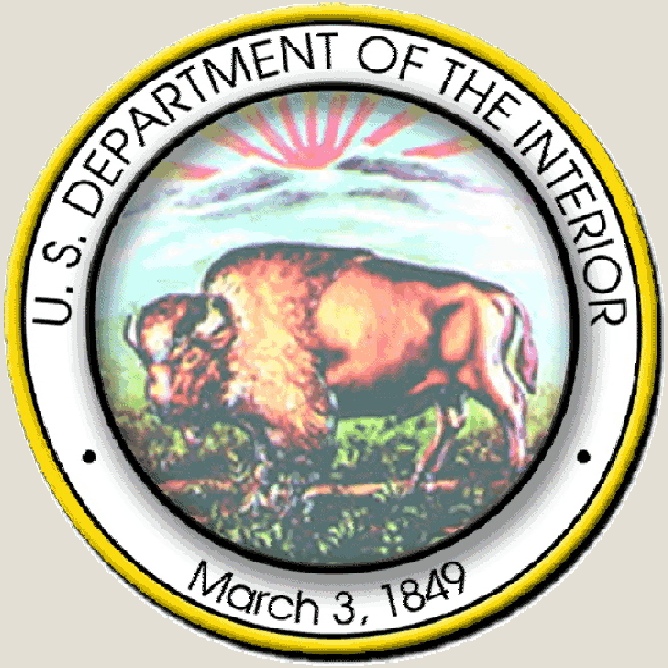


Onshore Infrastructure

- Service Bases at Port Facilities / Helicopter Hubs
- Processing Facilities
  - refineries, gas processing plants
- Terminals
  - pipeline shore facilities, barge terminals, tanker port areas
- Construction Facilities
  - Fabrication yards, shipyards, pipecoating facilities and yards

Current MMS Study “Oil and Gas Infrastructure in the Mid-Atlantic (GM-09-08)” with final report due June 2010

Thank You



Michael.Saucier@mms.gov

Website: www.mms.gov

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